

Promising natural insecticides

The vegetables in our gardens look delicious to us—and to bugs. Beetles, caterpillars and other insects are threatening our crops now.

When we see bugs in the garden, our first inclination is to apply an insecticide. This makes sense, but none of us enjoy eating vegetables recently treated with *poisonous chemicals* (see photo).

It would be nice if we could find insecticides that are both *effective* and *practically non-toxic*.

Organic growers have used *Bacillus thuringiensis* for decades, but its most common strain (*kurstaki*) only kills caterpillars (armyworms, earworms and cabbage worms) (see table). Today we have several more choices of insecticides and can control many more insect pests in the garden through low-toxic, natural products.

Neem oil, derived from a tree in Asia, has been used to control insect pests for thousands of years. Its most effective chemical, azadirachtin, repels insects and reduces their ability to feed. It disrupts the hormones of insects, preventing them from developing normally and reproducing.

Neem works against almost all insect pests in the garden. As a bonus, it will prevent powdery mildew and many other fungal diseases.

Neem has limitations. It does not kill on contact. Insect feeding is reduced but will not stop. Since it disrupts insect development, it is most effective when used against insects *before* they mature. Neem can burn stressed and wilted plants as well as the petals of such tender flowers as hibiscus and rose.

Spinosad was discovered from soil in a Caribbean rum distillery. It



Synthetic carbaryl dust is a very popular insecticide. Safer, natural alternatives are becoming more widely available today.

is deadly when it is *eaten* by the bug. A pest that eats the treated foliage/fruit will stop eating and die 1–2 days later. Spinosad does a poor job controlling pests that *suck* sap out of plants. This includes aphids, cucumber beetles and leafhoppers.

If you are looking for a quick kill, pyrethrum is an option. Derived from chrysanthemum flowers, it acts as a nerve poison. Its chemical, pyrethrin, is effective against a wide variety of insect pests (see table).

All of these natural products have slight or very low toxicities to humans. They all have very short lives in the environment, which reduces the likelihood of killing beneficial insects.

The bottom line is we have natural choices to fight insect pests in our garden. Read pesticide labels carefully and follow directions. Used properly, we can protect our crops and enjoy a safe, abundant harvest.

Effectiveness and toxicity of natural pesticides and synthetic carbaryl in home vegetable production.

Ingredient ¹	Aphids	Caterpillars ²	Colo. potato beetle	Cucumber beetle	Cutworm	Flea beetle	Leafhoppers	Thrips	Whitefly	Oral LD ₅₀ ³	Acute oral toxicity ⁴	Days from use to harvest
<i>B. thuringiensis</i>		●								>5000	Very low	<1
Azadirachtin	●	●	●	●	●	●	●	●	●	>5000	Very low	<1
Spinosad		●	●			●		●		>5000	Very low	1–3
Pyrethrin	●	●	●	●		●	●	●	●	>2000	Slightly	<1
Carbaryl		●	●	●	●	●	●	●		590	Slightly	2–14

¹ Data from specimen labels and Material Safety Data Sheets for Dipel Dust, Azaguard, Entrust, PyGanic and Sevin, respectively.

² Armyworm, various cabbage worms, corn earworm, and leafroller.

³ Amount of pesticide (mg) per body weight (kg) required to kill 50 percent of rats. Lower values indicate greater toxicity.

⁴ Based on US EPA Acute Toxicity Ratings system: Highly (<50), Moderately (50–500), Slightly (500–5000), Very low to almost nontoxic (>5000).

Sources:

- Johnny's Selected Seeds. 2013. Insecticides. 2013 catalog, p. 198.
 Kelly Solutions. 2014. Specimen labels and Material Safety Data Sheets for Dipel Dust, Azaguard, PyGanic, Entrust and Sevin. Accessed online 8/25/2014.
 Russ, K. 2005. Less toxic insecticides. Clemson Univ.: Clemson, SC.

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